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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/581,851

02/22/2007

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42598-4100

4586

21611 7590 07/22/2009
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EXAMINER

SLAWSKI, BRIAN R

ART UNIT

PAPER NUMBER

1791

MAIL DATE

DELIVERY MODE

07/22/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/581,851	Applicant(s) TAKEUCHI ET AL.	
	Examiner BRIAN R. SLAWSKI	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 02 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 7-9 and 15-17 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-9, and 15-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>21 July 2008</u> | 6) <input type="checkbox"/> Other: _____ |

BONDING APPARATUS AND BONDING METHOD

Election/Restrictions

1. Applicant's election without traverse of Group I, species 1.a., drawn to a bonding apparatus in which substrates are conveyed by a plurality of turntables comprising concentric small-diameter and large-diameter tables, is acknowledged. Applicant's cancellation of claims 5, 6, and 10-14, drawn to the non-elected species, and addition of claims 15-17, consistent with the elected subject matter, is also acknowledged. While Applicant is permitted to cancel the non-elected claims 5, 6, and 10-14, the examiner recommends that Applicant instead resubmit the subject matter of claims 5, 6, and 10-14 as new claims in a future amendment. Although such new claims would be withdrawn from consideration by the examiner as being drawn to a non-elected species, this resubmission would allow Applicant to file a divisional application claiming the non-elected species while avoiding double-patenting rejections.

Claim Objections

2. Claims 15 and 17 are objected to because of the following informalities: The word "rotatable" is used, where Applicant is believed to have intended "rotatable" in claim 15, L. 4, and claim 17, L. 2. Appropriate correction is required.

Claim Rejections—35 USC §102

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3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4 and 7-9 are rejected under 35 U.S.C. 102(b) as being unpatentable over Matsumoto et al. (US 2003/0104097).

Regarding claim 1, Matsumoto et al. teach an apparatus for making optical recording discs by adhering together pairs of molded disc substrates on which reflective films have been formed [0001, 0002]. Following molding means 1 and a film-forming device 8, the apparatus comprises a bonding part on turntable 10 and a curing part on turntable 20 (Fig. 1; [0034, 0041-0042, 0044, 0053]). Film-coated substrates are transferred to turntable 10, which has twelve substrate-receiving portions 10a around its edge. Each adjacent pair of positions 10a receives two differently-formed substrates A and B that will become the two halves of a complete optical disc. Reversing means 11 flips over substrates B, an adhesive supply mechanism 12 applies adhesive to substrates A, an overlapping mechanism 13 picks up reversed substrates B and carries them to overlap the adhesive-coated substrates A, and the substrates A and B are brought into contact and bonded (Fig. 6, 7, 9; [0045-0048, 0081-0083, 0088, 0091]).

Conveying means comprising turntable 10, movably mounting mechanism 14, and turntable 20 then convey the bonded pairs of substrates from the bonding part to the curing part while they stand at room temperature in the atmosphere. Substrate pairs are rotated on turntable 10 to a delivery position P4, moved by mounting

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mechanism 14 onto either of two spinners 15, 16 that centrifugally distribute the adhesive between the substrate pairs, and transferred by mounting mechanism 19 to turntable 20 [0049-0051, 0054]. The turntable 20 rotates to carry the bonded substrate pairs to a curing part at position P9, where a curing device 23 irradiates the substrate pairs with ultraviolet rays to cure the adhesive [0059].

Regarding claims 2 and 3, Matsumoto et al. teach conveying means comprising multiple turntables 10 and 20 that rotate while carrying a plurality of the substrates.

Regarding claim 4, Matsumoto et al. teach that the multiple turntables include concentric small-diameter and large-diameter tables, in that the turntable 10 includes a large-diameter table that carries the substrates in receiving positions 10a and a concentric small-diameter table on which the adhesive supply mechanism 12 is mounted (Fig. 1; [0045, 0047]).

Regarding claim 7, Matsumoto et al. teach that the overlapping mechanism 13 on turntable 10 stacks and bonds pairs of substrates A and B, and that these stacked pairs are then conveyed from the bonding part to the curing part by accommodating parts on turntable 10, moveably mounting mechanism 14, and turntable 20 (Fig. 7; [0048-0049, 0055, 0091-0092]).

Regarding claim 8, Matsumoto et al. teach conveying the substrates from the bonding part to the curing part using only turntables 10 and 20 and mounting mechanisms 14 and 19 that adsorb the substrates and swivel to transport them [0065, 0067], so that no shifting of the substrates occurs between the bonding part and curing part.

Regarding claim 9, Matsumoto et al. teach that during the conveying from the bonding part to the curing part, the substrate pairs are conveyed on turntable 20, where a weight is placed on top of each substrate pair at position P7 to assist correction of warping of the substrates following bonding [0056-0057], such that the conveying time is sufficient to correct warping with the help of this weight.

Claim Rejections—35 USC §103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hosogai (JP 10-289491) in view of Kotoyori (JP 2002-074759) and Higaki et al. (US 2002/0108715).

Regarding claim 15, Hosogai teaches an apparatus for making optical recording disks including a pair of thin plastic substrates (“synthetic resin boards”) W1, W2 including a recording layer (“signal surface”) that are coated with an adhesive S and bonded together (Fig. 8, 9; [0001-0004, 0007]). The apparatus comprises a rotatable conveying unit—turntable T and its peripheral turntable-like attachment components 1 for carrying the substrates—that receives the pair of substrates with interposed adhesive at a load position d (where substrate W1 is received from a preceding

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adhesive-applying position c, and substrate W2 is loaded above and concentrically to substrate W1); and means for rotating the conveying unit T to sequentially position the pair of substrates at subsequent positions. These positions include a bonding position e, where the substrates are contacted and pressed together under low pressure, and where vacuum is applied to the pair of substrates, via an adsorption groove connected to a vacuum source, to hold substrate W1 in place; a substrate rotary position f, where the attachment component 1 carrying the bonded substrates is spun at high speed to uniformly distribute the adhesive S; a curing position g, where the pre-cured bonded substrates are irradiated by ultraviolet light; a post-curing empty position h; and an exit or extraction position i for removal of the optical recording disk (Fig. 6; [0009, 0014]).

Hosogai does not explicitly teach that the substrate rotary position f between the bonding position e and curing position g enables movement of the bonded substrate pair W1, W2 to prevent warping by relieving stress between the substrates. However, Kotoyori also teaches making optical recording disks by laminating a pair of thin plastic substrates 1, 2, particularly addressing the problem of stress and warpage arising in the laminated disc before curing (Abstract; [0005, 0008]). Kotoyori teaches that after bonding the two substrates 1, 2 with UV-curing adhesive 3, the resulting unhardened (i.e., uncured) laminated disk 4 typically exhibits some curvature due to residual stress from molding and punching of center holes, but that by simply supporting the uncured laminated disk 4 on a flat support member 12 for a short time (e.g., about 1 second), the disk settles into a flat form against the support member's flat surface 13, and can then be cured in this shape by UV irradiation (Fig. 3a, b; [0005, 0044-0046]). Hence it would

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have been obvious to one of ordinary skill in the art to keep Hosogai's bonded substrates W1, W2 in the pre-curing rotary position f on flat attachment component 1 for at least about 1 second, because Kotoyori teaches that this pre-curing standing time on a flat support relieves internal stress in the bonded substrates to prevent warping.

Hosogai also does not explicitly teach that the post-curing empty position h enables relief of heat warping from the UV curing. However, Higaki also teaches making optical recording disks by bonding a pair of plastic substrates with UV-curing adhesive, then curing the adhesive by UV irradiation, and teaches that the curing step tends to warp the bonded substrates by uneven heating (Abstract; [0002, 0008-0009, 0059]). Higaki teaches that this warping can be prevented by, e.g., carrying out the irradiation in two steps, where the adhesive is only partly cured and the substrates only moderately heated in the first irradiation, or by limiting the amount of UV light that the substrates absorb using a timed shutter [0093, 0094, 0100-0101, 0103]. Higaki teaches that the heat warping of the bonded substrates after irradiation can be absorbed by simply allowing time for the substrates to cool and return to their original flat state [0094-0095]. Hence it would have been obvious to one of ordinary skill in the art to avoid heat warping resulting from curing of Hosogai's bonded substrates W1, W2, by dividing the radiative curing step at position g into plural stages or limiting the amount of UV exposure with a shutter, and by providing the substrates sufficient time at post-curing position h to absorb any heat warping and settle into a flat state, as taught by Higaki.

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7. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosogai, Kotoyori, and Higaki et al. as applied to claim 15 above, and further in view of Paulus et al. (US 6,098,272).

Regarding claim 16, the skilled artisan cognizant of Kotoyori would have known to maintain Hosogai's bonded pair of substrates W1, W2 at pre-curing rotary position f for a period sufficient to relieve the substrates' internal stress and let them settle into a flat form against the flat support 1, as explained in paragraph 6 above. Kotoyori does not explicitly teach maintaining the substrates in this position f for as long as 15 seconds. However, Paulus et al. also teach making optical recording disks by bonding pairs of plastic substrates 6 with UV-curable adhesive to form combinations 7 of substrates and adhesive at station 35, conveying the bonded combinations 7 from the bonding station 35 to a spin station 40 on a conveying unit 25, spinning the combinations to distribute the adhesive more evenly, and curing the adhesive with UV light at cure station 45 (Fig. 2; col. 1, L. 38-41; col. 4, L. 16-30, L. 34-41). Paulus et al. teach that the combinations' standing time between the bonding station 35 and spin station 40 should be sufficient to allow the adhesive to flow to, but not beyond, the moats that are conventionally molded into such substrates, and teach that a preferred length of this standing time is approximately 23 seconds (col. 2, L. 25-30; col. 4, L. 30-34; col. 5, L. 22-30). Thus it would have been obvious to one of ordinary skill in the art to maintain Hosogai's bonded pair of substrates W1, W2 at the pre-curing rotary position f for at least 15 seconds, because Paulus et al. teach that such a standing time should be provided to allow the adhesive to spread sufficiently between the substrates.

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Regarding claim 17, Hosogai teaches as the rotatable conveying unit a turntable T which rotates while carrying multiple plastic substrates W1, W2 (Fig. 6; [0009]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN R. SLAWSKI whose telephone number is (571)270-3855. The examiner can normally be reached on Monday to Thursday, 7:30 a.m. to 5:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino, can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brian R. Slawski/
Examiner, Art Unit 1791

B.R.S.

/Richard Crispino/
Supervisory Patent Examiner, Art Unit 1791